

DEVELOPMENT AND TESTING OF A PHOTO-POLARIMETER FOR SPACE VEHICLES

Final Report
NASr-138

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Cope Dore

by

UNPUBLISHED PRELIMINARY DATA

Lunar and Planetary Laboratory
University of Arizona
Tucson, Arizona

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CV21 LIFE 305A

Monochrometer

It was originally planned to go to the McDonald Corporation in St. Louis for the calibrations of the MARINER Photopolarimeter. However, it appeared advantageous to build the test instrument here in our laboratory and keep it here, especially since no proper instrument was available for the check of instrumental polarization and depolarization.

A picture of the test instrument is hereby attached. Teska, Pellicori, and Roland gave a report to the American Astronomical Society meeting in Tucson on April 18, 1963, describing some of the work of our polarization programs and specifically the work with this test instrument.

The test instrument is in operation for determinations of the refractive index, of phototube response, of the transmission of various filters and of instrumental polarization and depolarization of various components.



Second Ground Station

The second ground station of the POLARISCOPE program was built at the Applied Research Laboratory. It is being used for various tests and is performing beautifully. We expect to use it very much, especially during various balloon flights in the future.

GROUND STATION:

Tally
Paper-tape
Punch

Ground-Receiver Panel

3 high-resolution*
quick-look meters

Television Display

2 quick-look indicators *

Command Switches
(telescope pointing,
filter choice, etc.)

Power-control
Panel

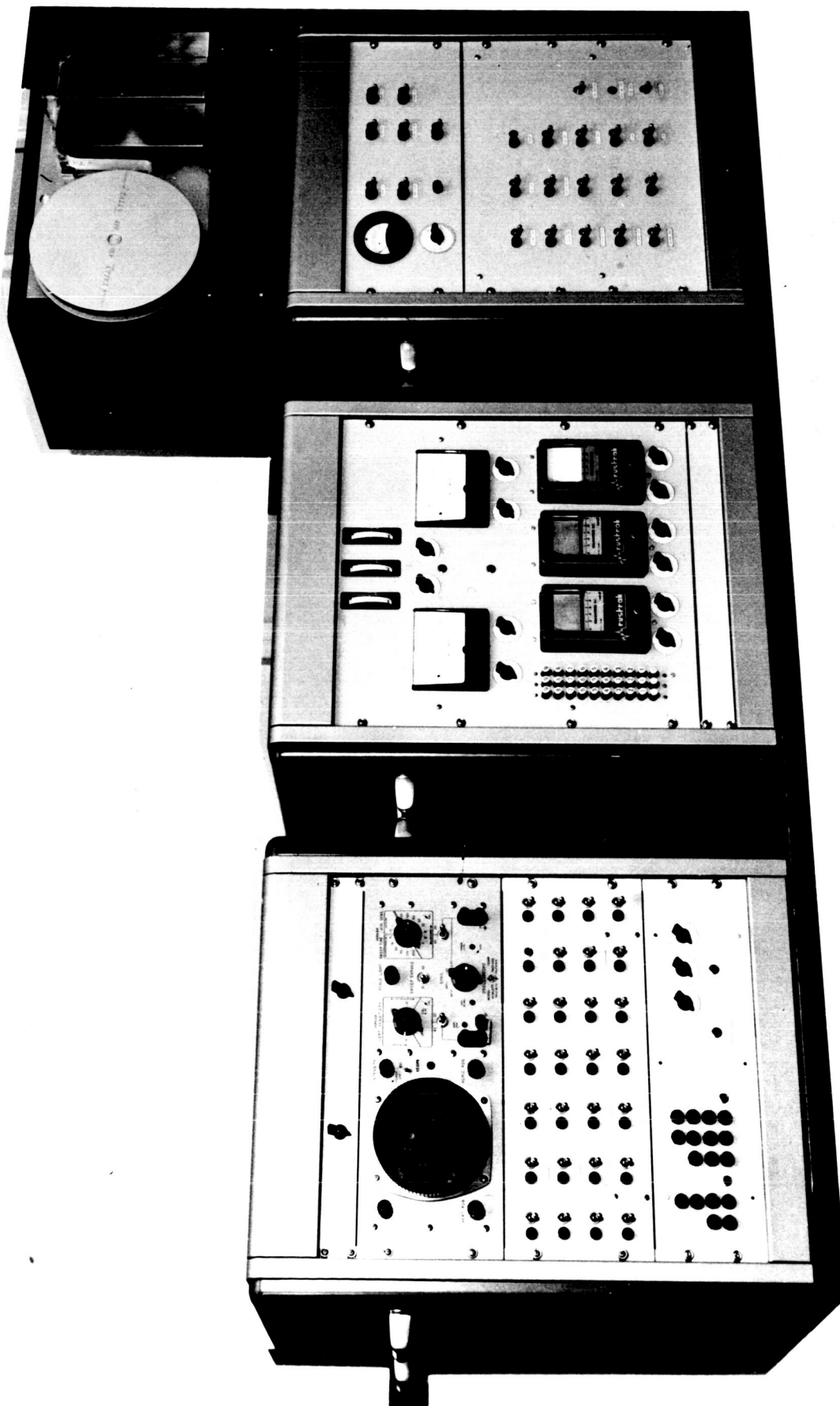
Continuation
of
Command Switches

manual
input
for
punch

3 Rustrack
Recorders *

Clock Integration
 Timer

* can be switched to
any of the 41 channels



The MARINER Photopolarimeter

Two pictures are hereby attached, one of the MARINER photopolarimeter, and the other of the photopolarimeter mounted in the NCAR balloon gondola. The polarimeter consists of two Cassegrain telescopes with 3-inch aperture, followed each by a focal plane diaphragm, a Lyot depolarizer, a filter wheel, an ADP Wollaston prism and two phototubes. For the application during balloon flight, the phototubes are Ascop 541F, and the filters are at 2800 and 2200 Angstroms.

The polarimeter can be moved in azimuth and elevation. The NCAR azimuth control is by tracking on the moon. The command electronics and the telemetry have now been integrated with that of the NCAR systems. Various environmental checks have been accomplished. More environmental and other checks are on the program but the first flight is scheduled to take place within a few months.

The first flight is a test flight to 120,000 feet. With NASA support (NASr-185), NCAR has made available the balloons and helium for 3 or 4 flights.

In conclusion, I would like to thank NASA for the support of our work.

Tom Gehreis
October 31, 1964

